Harnessing the Economic, Nutritive, and Commercial Potential of Pomace through UPE

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Introduction

136 million tons of food processing waste (FPW) is dumped into landfills. Food scraps makes up 14% of the total FPW produced each year.[1]

Key Takeaways

Global Impact	Food Wasted	Green House Emissions
1.3 billion metric tons is wasted or lost from food processing waste[2]	55 million metric tons of food waste per year in the USA[3]	113 million metric tons of CO2 is emitted into gas emissions[3]

Don't Waste the Waste

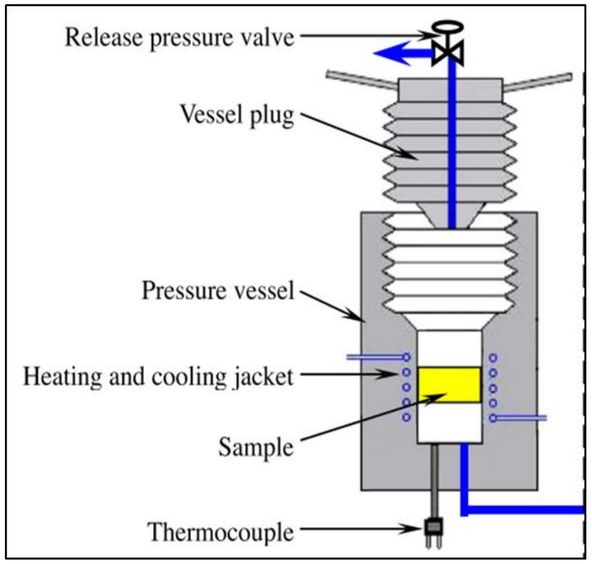
Compost
- Organic Matter
- Fertilizer or soil conditioner
- Adds nutrients to the soil
- Reduces pressure on landfills

Animal Feed
- Cost efficient
- Rich in natural nutrients
- Lessens Carbon footprint

Biofuel
- Filled with carbon and nutrient sources allowing for bioproduction of fuel.

Extraction of BACs
- Source of natural ingredients
  - Antioxidant
  - Anticancer
- Utilizes all components of pomace

Ultra-High Pressure Extraction



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- Ultra-high pressure extraction (UPE) is an extraction method that can be used to extract BAC's from nutritious food waste (pomace)
- The mode of action is Le'chatliers Principle
- During extraction, high pressure is used to deform the cell walls of the pomace, the damage to the cell walls allows for an enhanced rapid dissolution of BACs into the solvent.
- UPE can operate at low temperatures (suitable for thermolabile compounds) and uses GRAS solvents which is cost effective.

Biologically Active Compounds


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Biologically Active Compounds (BACs)
- plant secondary metabolites (polyphenols).
- Pomace is the by-product that remains after fruits are pressed, this includes the skin, seed, peel, core, calyx, and stem.

BACs	Bioactivity	Usage
Flavanols (Quercetin)	Antioxidant	Natural preservative, Anticancer agents
Carotenoids (Carotenes)	Radical scavenger	Anticancer, anti-aging formulations
Flavonones (Hesperidine)	Antioxidant	Cardio-protective agents, pain reliever in arthritis
Dietary fiber (Pectins)	--	Swellable polymer in food

Possible Products

- Products could be produced from the pomace extract with natural antioxidants, anti-inflammatories, and would have no artificial contents added.
- Replace hazardous synthetic ingredients that are added to beverages and food products.
- The products developed could be used as natural flavorings for beverages and food.

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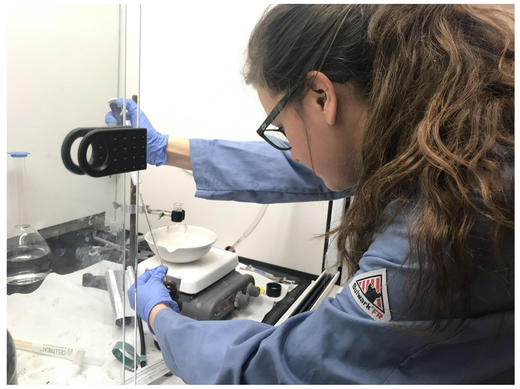
Summary



- In summary the extraction of BACs using UPE provides short extraction time, effective extraction of thermolabile compounds and can be executed in large quantities.
- The amount of organic waste thrown out every year can be utilized through UPE methods to produce natural and antioxidant filled products. The results from this study will demonstrate why UPE should be used commercially for the natural extraction of BACs.

References and Acknowledgements

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